Comprehensive Professional Vitae

Name: Seongkyu Yoon
Department: Chemical Engineering
College: Engineering
Rank: Professor **Field**: Systems & Synthetic Biology, Drug Delivery, Process Systems Engineering, Regulatory Sciences

---

EDUCATION AND ACADEMIC QUALIFICATIONS

- **Education**

Master of Business Administration 2007- 2017
Babson College, F.W. Olin Graduate School of Business, Wellesley, MA
Doctor of Philosophy, Dept of Chemical Engineering 1996 - 2001
McMaster University, Hamilton, ON, Canada
Master of Science, Dept of Chemical and Biomolecular Eng. 1988 – 1990
Korea Advanced Institute of Science and Technology, Daejeon, Korea
Bachelor of Eng, Dept of Chemical and Biomolecular Eng. 1984 – 1988
Yonsei University, Seoul, Korea

- **Academic Experience**

University of Massachusetts Lowell
Professor, Department of Chemical Eng. 2018 – Current
Associate Professor, Department of Chemical Eng. 2016 – 2018
Assistant Professor, Department of Chemical Eng. 2010 – 2016

PROFESSIONAL ACTIVITIES

- **Professional Experiences**

National Academy of Sciences, Committee on Identifying Innovative Technologies in Pharmaceutical Manufacturing Dec 2019- Dec. 2021

US Food and Drug Administration
Center for Drug Evaluation and Research/OTR, Visiting Professor, Jun 2019 – Aug 2019
ORISE Research Fellow, 2014, 2015, 2016

University of Massachusetts Lowell, MA USA 2010-Current
Assistant/Associate/Professor, Department of Chemical Engineering;
NSF/AccelNet/IBioNe (International Biomanufacturing Network), Co-PI
NSF/IUCRC Advanced Mammalian Biomanufacturing Innovation Center (AMBIC) UMass Lowell, Site Director, 2016-Current
Director of Biomanufacturing Innovation Institute, 2015-Current
Co-Director of Massachusetts Biomanufacturing Center, 2010-Current

Biogen Biopharmaceutical, Cambridge MA 2005-2010
Manufacturing Sciences Group Lead

Umetrics Data Analytics (now Satorius Data Analytics) 2001-2005
Sr. Application Staff

LG Chemical, Seoul, S. Korea (Former Hyundai) 1990-1996
Sr. Process Control Engineer

- **Professional Association Participation**

Membership in Professional Societies

1) Technical Committee of NIIMBL (2017-Current)
2) Executive Director, Korean American Bio-Industry Council (2012-Current)
3) Member, American Association of Cancer Research (AACR) (2010 – Current)
4) Member, Massachusetts Separation Society (MASS SEP) (2010-Current)
5) Member, Process Analytical Technology Roundtable (PPAR) (2009-Current)
6) Member, International Society of Pharmaceutical Engineer (ISPE) (2005 – Current)
7) Member, American Chemistry Society (ACS) (2005 – Current)
8) Member, International Chemometrics Society (ICS) (2001 – Current)
9) Member, American Institute of Chemical Engineers (AIChE) (2001 – Current)
10) Member, Korean Scientist and Engineer Association (2001- Current)
11) Member, Korean American Society in Biotech and Pharmaceuticals (2001-Current)

Editor of journals

1) Editorial Board, Preparative Biochemistry and Biotechnology (2015 – Current)
2) Board, International Forum of Process Analytical Technology (2017 – Current)
3) Guest Editor, Processes (2015, 2020)
4) Editor, Journal of Chemical Technology and Biotechnology (2014 - Current)
5) Editorial Board, Journal of Pharmaceutical Processing (2013 – Current)
6) Editorial Board, AIMS Medical Science (2013 – Current)

Conference, workshop and training Organized

1) NSF/IUCRC AMBIC Biannual Meeting, Wilmington DE, June 2022
2) NSF/IUCRC AMBIC Biannual Meeting, Virtual, Jan 2022
3) NSF/IUCRC AMBIC Biannual Meeting, Lowell MA, July 2021
4) Industry short course: “Bioprocess Data Analytics and Machine Learning”, MIT, MA, Jun 29-30, 2021
5) Industry short course: “Statistical 101 and Quality Control for Biopharmaceutical”, Virtual, May 17-19, 2021
6) Industry short course: “Viral Vector for Gene Therapy Manufacturing”, Virtual, March 9-11, 2021
7) Industry short course: “Industrial Lyophilization Training”, Virtual, Feb 8-10, 2021

8) Industry short course: “Bioprocess Data Analytics and Machine Learning”, MIT, MA, Oct 12-14, 2020
9) NSF/IUCRC AMBIC Biannual Meeting (Virtual), June 2020
10) Industry short course coordinator: “Advanced Industrial Bioprocessing”, Lowell MA, Aug 5-9, 2019
11) NSF/IUCRC AMBIC Biannual Meeting, College Park, MD, Dec 2019
12) NSF/IUCRC AMBIC Biannual Meeting, Cambridge MA, June 2019
13) NSF/IUCRC AMBIC Biannual Meeting, St, Louis MO, Dec 10-12, 2018
14) Session Chair/Co-Chair: “Biomanufacturing“, IFPAC 2019, North Bethesda, MD, Feb. 2019
15) NSF/IUCRC AMBIC Biannual Meeting, South San Francisco, June 18-20, 2018
16) Industry short course coordinator: “Continuous Chromatography”, Lowell MA, Oct 17, 2018
17) Industry short course coordinator: “QbD/PAT in Biopharmaceutical”, Lowell MA, Oct 24, 2018
18) Industry short course coordinator: “Advanced Industrial Bioprocessing”, Lowell MA, Aug 6-10, 2018
19) Conference Chair and Coordinator: “Biomanufacturing Innovation”, Biomanufacturing Annual Summit, Boston MA, Sep 9-10, 2018
20) Session Chair/Co-Chair: “Biomanufacturing“, IFPAC 2018, North Bethesda, MD, Feb. 2018
21) Industry short course coordinator: “Advanced Bioprocessing”, Biopharmaceutical Summit Boston MA, May 24-26, 2017
22) Conference Chair and Coordinator: “Beyond monoclonal antibody”, Biomanufacturing Annual Summit, Boston MA, May 22-23, 2017
23) Session Chair/Co-Chair: “Biomanufacturing“, IFPAC 2017, North Bethesda, MD, Feb. 2017
24) Session Chair/Co-Chair: “Biomanufacturing“, AIChE 2016 Annual Meeting, San Francisco CA, Nov, 2016 Industry short course coordinator: “Integrated Continuous Bioprocessing”, Biopharmaceutical Consortium, Lowell MA, May 18-20, 2016 (15 people attended)
25) Conference Chair and Coordinator: “Future Biomanufacturing”, Biomanufacturing Science and Technology Consortium Annual Summit, Boston MA, May 23-24, 2016 (140 people attended)
26) Industry short course coordinator: “PAT and QbD in Biopharmaceutical”, Biopharmaceutical Consortium, Lowell MA, May 20-22, 2015 (15 people attended)
27) Conference Chair and Coordinator: “Raw material variability and its process control in Bioprocessing”, Biopharmaceutical Consortium Annual Summit, Lowell MA, May 18-19, 2015 (100 people attended)
28) Training Coordinator: “Quality by Design (QbD) training” Osong Medical Innovation Foundation, Clinical Drug Manufacturing Center, Osong, Korea, Sep, 2014 (30 people attended)
29) Industry short course coordinator: “PAT and QbD principles in Bioprocessing”, Biopharmaceutical Consortium, Lowell MA, May 27-28, 2014 (25 people attended)
30) Conference Chair and Coordinator: “PAT and QbD in Biopharmaceutical”, Biopharmaceutical Consortium Annual Summit, Lowell MA, May 29-30, 2014 (140 people attended)

31) Training Coordinator: "Process Analytical Technology (PAT) training" Osong Medical Innovation Foundation, Clinical Drug Manufacturing Center, Osong, Korea, Oct 27-28, 2013 (40 people attended)
32) Workshop Coordinator: "Training Technology Leader", Professional Science Master (PSM) workshop for Korean Professors, Lowell MA, June 17-19, 2013
33) Industry short course coordinator: "Continuous Bioprocessing", Biopharmaceutical Consortium, Lowell MA, May 29-30, 2013 (25 people attended)
34) Conference Chair and Coordinator: "Continuous Bioprocessing", Biopharmaceutical Consortium Annual Summit, Lowell MA, May 15, 2013 (140 people attended)
35) Conference organizing committee and session chair: Metabolomics and Systems Biology, Chicago, Apr 8-10, 2013
36) Advisory board member and session chair: P2P (Process to Product), International Bioprocess Conference, Washington DC, Oct 12-13, 2012
37) Session Chair/Co-Chair: "Process monitoring, Life Sciences modeling sessions", AIChE 2011 Annual Meeting, Pittsburg, PA, Oct, 16-21, 2012
38) Conference Chair and Coordinator: "Biopharmaceutical Challenges and Innovation", Biopharmaceutical Consortium Annual Summit, Lowell MA, Mar. 9, 2012 (135 people attended)
39) Session Chair/Co-Chair: "Process monitoring, Life Sciences modeling sessions", AIChE 2011 Annual Meeting, Minneapolis, MN, Oct, 16-21, 2011
40) Advisory board member and session chair: P2P (Process to Product), International Bioprocess Conference, Washington DC, Oct 14, 2011
41) Advisory board member and session chair: P2P (Process to Product), International Bioprocess Conference, Bethesda, MD, Oct 18, 2010

Honors and awards

1) MBI (Model Based Innovation) Award 2019, Winner
2) MBI (Model Based Innovation) Award 2018, Runners-Up:
3) Robert and Gail Ward Endowed Professorship in Biomedical Material Sciences (2016-2018)
4) FDA ORISE Fellow (2014, 2015, 2016)
5) Special advisory board of Korean Ministry of Food and Drug Safety (2014)
6) CPC/FOCAPD, Travel Award ($10,500) (2012, 2014, 2016)
7) Global Pharmaceutical Leader (GPKOL) of Korean Health Industry Development Institute (KHIDI) (2013)
8) CCE XIII, Travel Award ($2,600) (2012)
9) UMass Medical, CTTS Annual Retreat Best Poster Award (May 2011)
10) McMaster University Scholarship (1996-2001)
11) Sherman Scholarship for excellent teaching & research, McMaster Univ. (1999)
12) Korean-Canadian Scholarship Foundation, Canada (1997)
13) Excellent Engineer Award of the Year, Hyundai Petrochemical Co. (1995)
14) Korean government scholarship for Graduate Study (1988-1990)
15) Yonsei University Journalism Scholarship (1986-1988)

RESEARCH

Summary of Grants and Contracts awarded to Dr. Yoon Since September 2010

Grant	No of Grants	Amount	
Active	18	$	4,244,070
Completed	50	$	8,449,540
In-Kind	9	$	2,108,000
Total	76	$	14,901,610

2. Academic & Professional Publications

- **Refereed journal papers**

2022

[1] Hadley, B, K. Behere, V. Canning, J. Heimbach, S. Yoon, R, Gerber, R. Beri (2022), Evaluation of a Glycosylation Control Strategy for Monoclonal Antibodies through an Integrated Statistical and Experimental Approach, **Biotechnology & Bioengineering (In Revision).**

[2] Trunfio, N., J. Liu, H. Lee, and S. Yoon* (2022), Chemometric based image processing and delineation for the intraoperative mapping of nonmelanima skin cancer, IEEE Transactions on Biomedical Engineering, **TBME-01636-2017 (In Revision**)

[3] Namjoon Kim, Prokash Paul, Nicholas Trunfio, Garry Handelman, Jaeyeon Kim, *Lanyan Fang,* Seongkyu Yoon (2022), Bioequivalence Assessment of Generics and Biosimilars: Evaluation guidelines and regulatory consideration, **International Journal of Pharmaceutics (FDA Approval Pending)**

[4] Prokash Paul, Namjoon Kim, Seo-Young Park, Garry Handelman, Jaeyeon Kim, , and, Yoon, S.*, (2022), Advances and challenges of population PK/PD modeling of long-acting injectable, **Journal of Pharmacology (Submitted)**

[5] Prokash Paul, Namjoon Kim, Garry Handelman, Jaeyeon Kim, and, Yoon, S. *, (2022), Qualitative Analysis of Complex Pharmacokinetics of Generic and Reference Listed Long-Acting Injectable Products, **International Journal of Pharmaceutics (FDA Clearance Pending)**

[6] Yuri Svirkin, Jaeweon Lee, Richard Marx, Seongkyu Yoon, Nelson Landrau, Md Abul Kaisar, Bin Qin, Jin H. Park, Khondoker Alam, Darby Kozak, Yan Wang, Xiaoming Xu, Jiwen Zheng, Benjamin Rivnay. Amptericin B release rate is the link between drug status in the liposomal bilayer and toxicity, Asian Journal of Pharmaceutical Sciences, 2022, https://doi.org/10.1016/j.ajps.2022.04.007

[7] Kazarin, P., Kessler, W., Gong, E. *et al.* A Compact Model for Lyophilizer Equipment Capability Estimation. *AAPS PharmSciTech* **23,** 14 (2022). https://doi.org/10.1208/s12249-021-02167-8

2021

[8] Kuang, B., Dhara, V.G., Hoang, D., Jenkins, J., Ladiwala, P., Tan, Y., Shaffer, S.A., Galbraith, S.C., Betenbaugh, M.J. and Yoon, S., 2021. Identification of novel inhibitory metabolites and impact verification on growth and protein synthesis in mammalian cells. *Metabolic engineering communications*, *13*, p.e00182.

[9] Kazarin, P., Kessler, W., Gong, E., Yoon, S., Liu, H., Marx, R., Bogner, R. and Alexeenko, A., 2022. A Compact Model for Lyophilizer Equipment Capability Estimation. *AAPS PharmSciTech*, *23*(1), pp.1-15.
[10] Morris, C., Madhavarao, C.N., Yoon, S. and Ashraf, M., 2021. Single in-line biomass probe detects CHO cell growth by capacitance and bacterial contamination by conductivity in bioreactor. *Biotechnology Journal*, *16*(12), p.2100126
[11] Bogner, R., Gong, E., Kessler, W., Hinds, M., Manchanda, A., Yoon, S., Liu, H., Marx, R., Zhao, J., Sharma, P. and Bhambhani, A., 2021. A Software Tool for Lyophilization Primary Drying Process Development and Scale-up Including Process Heterogeneity, I: Laboratory-Scale Model Testing. *AAPS PharmSciTech*, *22*(8), pp.1-16.
[12] Liu, H., Meyer, R., Flamm, M. *et al.* Optimization of Critical Quality Attributes in Tablet Film Coating and Design Space Determination Using Pilot-Scale Experimental Data. *AAPS PharmSciTech* **22,** 17 (2021). https://doi.org/10.1208/s12249-020-01884-w
[13] Caitlin Morris, Yong Suk Lee, Seongkyu Yoon, Adventitious agent detection methods in bio-pharmaceutical applications with a focus on viruses, bacteria, and mycoplasma, Current Opinion in Biotechnology, Volume 71, 2021, 105-114, https://doi.org/10.1016/j.copbio.2021.06.027.
[14] Hoang, Duc, Shaun Galbraith, Bingyu Kuang, Amy Johnson, and Seongkyu Yoon. "Characterization of Chinese Hamster Ovary Cell Culture Feed Media Precipitate." *Biotechnology progress*.
[15] Graham, Ryan J., Adil Mohammad, George Liang, Qiang Fu, Bingyu Kuang, Ashli Polanco, Yong Suk Lee, R. Kenneth Marcus, and Seongkyu Yoon. "Effect of iron addition on mAb productivity and oxidative stress in CHO culture." *Biotechnology progress*.
[16] Graham, Ryan J., Stephanie A. Ketcham, Adil Mohammad, Evan Paregol, Seongkyu Yoon, Guozhang Zou, Tongzhong Ju, Patrick J. Faustino, Muhammad Ashraf, and Chikkathur N. Madhavarao. "Zinc supplementation modulates intracellular metal uptake and oxidative stress defense mechanisms in CHO cell cultures." *Biochemical Engineering Journal* 169 (2021): 107928.
[17] Sha, Sha, Bingyu Kuang, and Seongkyu Yoon. "Characterization of dynamic regulation in Chinese hamster ovary (CHO) cell cultures in the late exponential phase." *Biochemical Engineering Journal* 167 (2021): 107897. https://doi.org/10.1016/j.bej.2020.107897

2020

[18] Behere K., S. Yoon (2020), n-layer BET Adsorption Isotherm Modeling for Multimeric Protein A Ligand and its Lifetime Determination, Journal of Chromatography B. https://doi.org/10.1016/j.jchromb.2020.122434
[19] Behere K., S. Yoon (2020), Chromatography Bioseparation Technologies and In-Silico Modelings for Continuous Production of Biotherapeutics, Journal of Chromatography A., https://doi.org/10.1016/j.chroma.2020.461376
[20] Polanco, A, Kuang, B., S. Yoon, Bioprocess Technologies that Preserve the Quality of iPSCs", Trends in Biotechnology https://doi.org/10.1016/j.tibtech.2020.03.006
[21] Huang, Z, Galbraith, S., S. Yoon (2020), Effects of process parameters on tablet critical quality attributes in continuous tablet direct compression: A case study of integrating data-driven statistical model and first-principle flowsheet model" Pharmaceutical Development and Technology 1-12, https://doi.org/10.1080/10837450.2020.1805760

[22] Sha, S., Handelman, G., Agarabi, C. and S. Yoon, A high-resolution measurement of nucleotide sugars by using ion-pair reverse chromatography and tandem columns. *Anal Bioanal Chem* **412,** 3683–3693 (2020) https://doi.org/10.1007/s00216-020-02608-6
[23] Huang, Z, S. Yoon (2020), Integration of time-series transcriptomic data with genome-scale CHO metabolic models for mAb engineering. Processes, *8*(3), 331; https://doi.org/10.3390/pr8030331
[24] Huang, Zhuangrong, Jianlin Xu, Andrew Yongky, Caitlin S. Morris, Ashli L. Polanco, Michael Reily, Michael Borys, Zheng Jian Li, and Seongkyu Yoon. "CHO cell productivity improvement by genome-scale modeling and pathway analysis: Application to feed supplements." *Biochemical Engineering Journal* (2020), /doi.org/10.1016/j.bej.2020.107638
[25] Huang, Z, S. Yoon (2020), Identifying metabolic features and engineering targets for productivity improvement in CHO cells by integrated transcriptomics and genome-scale metabolic model, Biochemical Engineering Journal, https://doi.org/10.1016/j.bej.2020.107624
[26] Morris, C., Polanco, A., Yongky, A. *et al.* Bigdata analytics identifies metabolic inhibitors and promoters for productivity improvement and optimization of monoclonal antibody (mAb) production process. *Bioresour. Bioprocess.* **7,** 31 (2020). https://doi.org/10.1186/s40643-020-00318-6
[27] Sha, Sha, Garry Handelman, Na Liu, Dongming Xie, and Seongkyu Yoon. "At-line N-linked glycan profiling for monoclonal antibodies with advanced sample preparation and high-performance liquid chromatography." *Journal of Bioscience and Bioengineering* (2020). 130(3), September 2020, 327-333, https://doi.org/10.1016/j.jbiosc.2020.04.009
[28] RJ Graham, S Ketcham, A Mohammad, BMB Bandaranayake, T Cao, and S. Yoon, Zinc supplementation improves the harvest purity of β-glucuronidase from CHO cell culture by suppressing apoptosis, Applied Microbiology and Biotechnology 104 (3), 1097-1108
[29] SC Galbraith, S Park, Z Huang, H Liu, RF Meyer, M Metzger, MH Flamm, ns S. Yoon, Linking process variables to residence time distribution in a hybrid flowsheet model for continuous direct compression, Chemical Engineering Research and Design 153, 85-95
[30] Liu, Huolong, B. Rivnay, K. Avery, J. Myung, D. Kozak, N. Landrau, A. Nivorozhkin, M. Ashraf, and Seongkyu Yoon. "Optimization of the manufacturing process of a complex amphotericin B liposomal formulation using quality by design approach." *International Journal of Pharmaceutics* (2020): 119473.

2019

[31] Liu, Huolong, Brendon Ricart, Courtney Stanton, Brandye Smith-Goettler, Luke Verdi, Thomas O'Connor, Sau Lee, and Seongkyu Yoon. "Design space determination and process optimization in at-scale continuous twin screw wet granulation." *Computers & Chemical Engineering* 125 (2019): 271-286
[32] Sha, S., and S. Yoon (2019), An Investigation of Nucleotide Sugar Dynamics Under the Galactose Supplementation in CHO Cell Culture, Process Biochemistry 81, 165-174, doi:10.1016/j.procbio.2019.03.020
[33] YHV Soong, N Liu, S Yoon, C Lawton, D Xie, Cellular and metabolic engineering of oleaginous yeast *Yarrowia lipolytica* for bioconversion of hydrophobic substrates into high-value products Engineering in Life Sciences 19 (6), 423-443

[34] Sha, S., H. Zhuangrong, C. Agarabi, S. Lute, K. Brorson, and S. Yoon* (2018), E Prediction of N-linked glycoform profiles of monoclonal antibody with extracellular metabolite and two-step intracellular models, Processes. 7 (4), 227, doi:10.3390/pr7040227
[35] Galbraith, Shaun C., Huolong Liu, Bumjoon Cha, Seo-Young Park, Zhuangrong Huang, and Seongkyu Yoon. "Modeling and simulation of continuous powder blending applied to a continuous direct compression process." *Pharmaceutical development and technology* 23, no. 10 (2018): 1097-1107
[36] RJ Graham, H Bhatia, S Yoon, Consequences of trace metal variability and supplementation on Chinese hamster ovary (CHO) cell culture performance: A review of key mechanisms and considerations, Biotechnology and Bioengineering 116 (12), 3446-3456
[37] DN Powers, Y Wang, EJ Fratz-Berilla, SR Velugula-Yellela, B Chavez, .and S, Yoon, Real-time quantification and supplementation of bioreactor amino acids to prolong culture time and maintain antibody product quality, Biotechnology Progress 35 (6), e2894,
[38] B. Cha, Shaun C. Galbraith, Huolong Liu, Seo-Young Park, Zhuangrong Huang, Thomas O'Connor, Sau Lee, and Seongkyu Yoon (2019), A Thermodynamic Balance Model for Liquid Film Drying Kinetics of a Tablet Film Coating and Drying Process, AAPS PharmSciTech, 20 (5), 209
[39] B Rivnay, J Wakim, K Avery, P Petrochenko, JH Myung, D Kozak, S Yoon, Critical process parameters in manufacturing of liposomal formulations of amphotericin B, International journal of pharmaceutics 565, 447-457
[40] A Mora, B Nabiswa, Y Duan, S Zhang, G Carson, S Yoon, Early integration of Design of Experiment (DOE) and multivariate statistics identifies feeding regimens suitable for CHO cell line development and screening, Cytotechnology 71 (6), 1137-1153
[41] SC Galbraith, B Cha, Z Huang, S Park, H Liu, RF Meyer, MH Flamm, and S. Yoon, Integrated modeling of a continuous direct compression tablet manufacturing process: A production scale case study, Powder Technology 354, 199-210
[42] Liu, Huolong, Shaun C. Galbraith, Seo-Young Park, Bumjoon Cha, Zhuangrong Huang, Robert Frederick Meyer, Matthew H. Flamm, Thomas O'Connor, Sau Lee, and Seongkyu Yoon. "Assessment of spatial heterogeneity in continuous twin screw wet granulation process using three-compartmental population balance model." *Pharmaceutical development and technology* 24, no. 1 (2019): 105-117
[43] Seo-Young Park, Shaun C Galbraith, Bumjoon Cha, Huolong Liu, Zhuangrong Huang, HaeWoo Lee, Thomas O'Connor, Sau Lee, Seongkyu Yoon, (2019) Prediction of critical quality attributes and optimization of continuous dry granulation process via flowsheet modeling and experimental validation, Powder Technology, https://doi.org/10.1016/j.powtec.2018.02.042
[44] Park, S.-Y., Reimonn, T. M., Agarabi, C., Brorson, K. and Yoon, S. (2019), Metabolic responses and pathway changes of mammalian cells under different culture conditions with media supplementations. Biotechnology Progress, 0.1002/btpr.2623
[45] Sha, S., B. Bhatia, and S. Yoon* (2019), An RNAseq based transcriptomic investigation of Chinese Hamster Ovary cells with variant productivity and growth, Journal of Biotechnology https://doi.org/10.1016/j.jbiotec.2018.02.008
[46] Adam C. Fisher, Mark-Henry Kamga, Sau L. Lee, Seongkyu Yoon, and Kurt Brorson (2019), The Current Scientific and Regulatory Landscape in Advancing Integrated Continuous Biopharmaceutical Manufacturing, Trends in Biotechnology, https://doi.org/10.1016/j.tibtech.2018.08.008

2018

[47] Galbraith, Shaun C., Hemlata Bhatia, Huolong Liu, and Seongkyu Yoon. "Media formulation optimization: current and future opportunities." *Current opinion in chemical engineering* 22 (2018): 42-47.

[48] Sha, Sha, Zhuangrong Huang, Zhao Wang, and Seongkyu Yoon. "Mechanistic modeling and applications for CHO cell culture development and production." *Current opinion in chemical engineering* 22 (2018): 54-61. doi.org/10.1016/j.coche.2018.08.010

[49] Kamga, Mark-Henry, Maurizio Cattaneo, and Seongkyu Yoon. "Integrated continuous biomanufacturing platform with ATF perfusion and one column chromatography operation for optimum resin utilization and productivity." *Preparative Biochemistry and Biotechnology* 48, no. 5 (2018): 383-390.

[50] Behere, Ketki, Bumjoon Cha, and Seongkyu Yoon. "Protein a resin lifetime study: Evaluation of protein a resin performance with a model-based approach in continuous capture." *Preparative Biochemistry and Biotechnology* 48, no. 3 (2018): 242-256. /doi/full/10.1080/10826068.2018.1425711

[51] SC Galbraith, H Bhatia, H Liu, S Yoon (2018), Media formulation optimization: current and future opportunities, Current Opinion in Chemical Engineering 22, 42-47, https://doi.org/10.1016/j.coche.2018.08.004

[52] Mora, A., S. Zhang, G. Carson, B. Nabiswa, P. Hossler, S. Yoon (2018), Sustaining an efficient and effective CHO cell line development platform by incorporation of 24-deep well plate screening and multivariate analysis, Biotechnology Progress**, 34(1), 175-186,** 10.1002/btpr.2584

[53] Liu, Huolong, Shaun Galbraith, Bumjoon Cha, Zhuangrong Huang, Seoyoung Park, Meyer, R., Flamm, M., O'Connor Thomas, Lee, Sau, Yoon, S., (2018), Development of a three-compartmental population balance model for a continuous twin screw wet granulation process, Pharmaceutical Development and Technology doi.org/10.1080/10837450.2018.1427106

2017

[54] Liu, Huolong, Yoon, S. *, (2017), A Real-time optimization strategy of a pulsed-spray fluidized bed granulation process based on three-stage population balance model, Powder Technology, /doi.org/10.1016/j.powtec.2017.12.070 ,

[55] Velugula-Yellela, S., A. Williams, N. Trunfio, C. Hsu, B. Chavez, S. Yoon and C. Agarabi, (2017), Impact of media and antifoam selection on monoclonal antibody production and quality using a high throughput micro-bioreactor system, Biotechnology Progress, 10.1002/btpr.2575

[56] Kyriakopoulos, S., M. Lakshmanan, K. Ang, Z. Huang, S. Yoon, Z. Huang, R. Gunawan, D. Lee (2017), Kinetic modeling of mammalian cell culture bioprocessing, Biotechnology Journal, 10.1002/biot.201700229

[57] Bhatia, H., H. Mehdizadeh, D. Drapeau, S. Yoon, and M. Moshgbar* (2017), Quantitation of Amino Acids in Cell Cultures using Raman Spectroscopy, Engineering In Life Sciences, 18(1), 10.1002/elsc.201700084

[58] Galbraith, S.C. Zhuangrong Huang, Bumjoon Cha. Hurley Liu, Huolong, and S. Yoon *, (2017), Modeling and simulation of continuous powder blending applied to a continuous direct compression process, Pharmaceutical Development and Technology (Accepted on Dec 24, 2017), **doi.org/10.1080/10837450.2018.1425429**

[59] Kamga, M., Roper T, Padye S, Li Y, Cattaneo M, and Seongkyu Yoon * (2017), Integrated continuous biomanufacturing platform with ATF perfusion and one column chromatography operation, Preparative Chromatography and Biopharmaceutical, doi.org/10.1080/10826068.2018.1446151
[60] Trunfio, N., Lee, H., Starkey, J., Agarabi, C., Liu, J. and Yoon, S. * (2017), Characterization of Mammalian Cell Culture Raw Materials by Combining Spectroscopy and Chemometrics. Biotechnol Progress. doi:10.1002/btpr.2480
[61] Liu, Huolong, Galbraith, S.C., Ricart, Brendon, Stanton, Courtney, Smith-Goettler, Brandye, Verdi, Luke, O'Connor, Thomas, Lee, Sau, Yoon, Seongkyu* (2017), Optimization of critical quality attributes in continuous twin-screw wet granulation via design space validated with pilot scale experimental data. International Journal of Pharmaceutics, 525(1), 249-263, http://dx.doi.org/10.1016/j.ijpharm.2017.04.055
[62] Huang, Zhuangrong, D. Lee, and S. Yoon* (2017), Huang Z, Lee D-Y, Yoon S. Quantitative intracellular flux modeling and applications for biotherapeutic development and production using CHO cell cultures. Biotechnology and Bioengineering. 2017;1–12. https://doi.org/10.1002/bit.26384
[63] Liu, Huolong, Shaun Galbraith, Bumjoon Cha, Zhuangrong Huang, Seoyoung Park, and Seongkyu Yoon (2017), Online optimal control of a fluidized bed spary granulation process based on a three-phase population balance model FOCAPD Conference Proceeding
[64] Galbraith, S.C. Zhuangrong Huang, Bumjoon Cha. Hurley Liu, Huolong, and S. Yoon*, (2017), Flowsheet modeling of a continuous direct compression tableting process at production. FOCAPD Conference Proceeding

2016

[65] Huolong Liu, Seongkyu Yoon & Mingzhong Li (2016): Three-dimensional computational fluid dynamics (CFD) study of the gas–particle circulation pattern within a fluidized bed granulator: By full factorial design of fluidization velocity and particle size, Drying Technology, DOI: 10.1080/07373937.2016.1230628
[66] Bhatia H, Read E, Agarabi C, Brorson K, Lute S, Yoon S. * (2016), A design space exploration for control of Critical Quality Attributes of mAb. Int J Pharm. 2016 Oct 15; 512(1):242-52. PMID: 27575657.
[67] Bhatia H, Read E, Agarabi C, Brorson K, Lute S, Yoon S. * (2016), Hybridoma cell-culture and glycan profile dataset at various bioreactor conditions. Data Brief. 2016 Dec; 9:676-678. PMID: 27790631.
[68] Reimonn TM, Park SY, Agarabi CD, Brorson KA, Yoon S. * (2016), Effect of amino acid supplementation on titer and glycosylation distribution in hybridoma cell cultures-Systems biology-based interpretation using genome-scale metabolic flux balance model and multivariate data analysis. Biotechnol Prog. 2016 Sep; 32(5):1163-1173. PMID: 27452371.
[69] Sha, S., C. Agarabi, K. Brorson, and S. Yoon* (2016), N-Glycosylation Design and Control of Therapeutic Monoclonal Antibodies, Trends in Biotechnology. http://dx.doi.org/10.1016/j.tibtech.2016.02.013

2015

[70] Dong Ho Park, Hyo Sung Jeon, Soo Young Lee, Yi Young Choi, Hae Woo Lee, Seongkyu Yoon, Jae Chel Lee, Yoo Sang Yoon, Dae Sung Kim, Moon Jun Na, Sun Jung Kwon, Dong Sun Kim, Jaeku Kang, Jae Yong Park, Ji Woong Son (2015), microRNA-146a

inhibits epithelial mesenchymal transition in non–small cell lung cancer by targeting insulin receptor substrate 2 in lung cancer, International Journal of Oncology

[71] Bradley H. Diehl, Mark A. LaPack, Tony Y. Wang, Robert E. Kottmeier, Stacey M. Kaneshiro, Michael C. Brandenstein, Yongchun Zhang, Yuk Chun Chiu, Seongkyu Yoon, Victor M. Saucedo (2015), A Biopharmaceutical Industry Perspective on Single-Use Sensors for Biological Process Applications, BioPharm International, 28 (4)

[72] Priyank N. Shah, Namjoon Kim, Zhuangrong Huang, Mahesh Jayamanna, Edwin Jahngen, David Ryan, Seongkyu Yoon, Robert F. Kovar, and Yongwoo Lee (2015), Environmentally Benign Synthesis of Vinyl Ester Resin from Biowaste Glycerin, RSC Advances, DOI: 10.1039/C5RA03254G

[73] Rathore, A., C. Calado, K. Gernaey, S. Yoon (2015), Editorial of special issues on Process Analytical Technology, Journal of Chemical Technology and Biotechnology

[74] Lee, H., J Carvell, K. Brorson, and S. Yoon* (2015), Dielectric spectroscopy-based estimation of VCD in CHO cell culture, Journal of Chemical Technology and Biotechnology, 23 SEP 2014 DOI: 10.1002/jctb.4522

[75] Lee, H., A. Christie, J. Starkey, E. Read, S Yoon* (2015), Intracellular metabolic flux analysis of CHO cells supplemented with wheat hydrolysates for improved mAb production and cell-growth, Journal of Chemical Technology and Biotechnology (2014), 29 SEP 2014, DOI: 10.1002/jctb.4523

2014

[76] Ali Yousefian-Jazi, Jun-Hyung Ryu, Seongkyu Yoon, J. Jay Liu (2014), Decision Support in Machine vision system for monitoring of TFT-LCD glass substrates manufacturing, Journal of Process Control (2014), pp. 1015-1023 DOI information: 10.1016/j.jprocont.2013.12.009

2013

[77] Bawn, A., H. Lee, A. Downey, J. Xu, and S. Yoon* (2013) Metabolic-Sensing Characteristics of Absorption-Photometry for Mammalian Cell Cultures in Biopharmaceutical Processes, Journal of Pharmaceutical Bioprocessing (2013), 1(3), 255-266

[78] Bhoskar, P., B. Belongia, R. Smith, S. Yoon, T. Carter, and J. Xu (2013), Free Light Chain Content in Culture Media Reflects Recombinant Monoclonal Antibody Productivity and Quality, Biotechnology Progress, DOI:10.1021/btpr.1767

[79] Yoon S* (2013) Foreword, Journal of Pharmaceutical Bioprocessing (2013), 1(1), 1-2

[80] Kamga, M, H. Lee, J. Liu, S. Yoon* (2013) Quantification of Protein Mixture in chromatographic separation using Multi-wavelength UV spectra, Biotechnology Progress 29(3), 664-71

[81] Yoon, S*., H. Lee, J. Liu, (2013), Quality Characterization and Classification of Engineered Stone Countertops Using Soft-sensor Based on Image Analysis I&EC DOI: 10.1021/ie303442r

[82] Lee H., C. Lawton, Y. Na and S. Yoon* (2013), Robustness of Chemometrics-based Feature Selection Methods in Early Cancer Detection and Biomarker Discovery, Statistical Application in Genetics and Molecular Biology, 12(2), 207–223

2012

[83] Lee, H., A. Bawn, S. Yoon* (2012) Reproducibility, Complementary Measure of Predictability for Robustness Improvement of Multivariate Calibration Models via Variable Selections, Analytica Chimica Acta, 757 11-18
[84] Lee, H., A. Christie, J. Liu, S. Yoon* (2012) Estimation of raw material performance in mammalian cell culture using near infrared spectra combined with chemometrics approaches, Biotechnology Progress, 28(3), 824-832
[85] Lee, H., A. Christie, J. Xu, S. Yoon* (2012) Data fusion based assessment of raw materials in mammalian cell-culture, Biotechnology and Bioengineering, 109(11), 2819-2828
[86] Lee H. S. Yoon* (2012), Variability analysis of soy hydrolysate and its effects on mammalian cell culture performance using chemometric approach, Chemical Process Control VIII conference, Georgia (Conference Proceeding)
[87] Yousefian A., S. Yoon, and J. Liu (2012), Automatic grading of TFT-LCD glass substrates using optimized support vector machines, Industrial and Engineering Chemistry Research, 51(33), 10731-10982

1996-2011

[88] Yoon, S. and J. F. MacGregor (2004). P rincipal Component Analysis of Multiscale Data for Process Monitoring and Fault Diagnosis. *AIChE J.*, 50(11), 2891-2903.
[89] Yoon, S., N. Kettaneh, S. Wold, W. Pepe, and J. Landry (2003), Process Monitoring and Statistical Process Control of HF Furnaces using PCA/PLS, 2003 NPRA Plant Automation and Decision Support System, San Antonio, TX., USA
[90] Yoon, S. and J. F. MacGregor (2001). Fault Diagnosis with Multivariate Statistical Models, Part I: Using Steady-State Fault Signatures. *J. of Process Control*, 11. 387- 400.
[91] Yoon, S. and J. F. MacGregor (2001). Incorporation of external information into multivariate PCA/PLS models. *4th IFAC workshop on on-line fault detection and supervision in the chemical process industries (CHEMFAS-4)*, June 7~8, Chejudo, Korea,
[92] Yoon, S. and J. F. MacGregor (2001). Unifying PCA and multiscale approaches to fault detection and isolation. *6th IFAC symposium on dynamics and control of process systems (DYCOPS-6)*, June 4~6, Chejudo, Korea
[93] Yoon, S. and J. F. MacGregor (2000). Reply to letter to the editor. *AIChE J.*, 46(9), 1897-1899.
[94] Yoon, S. and J. F. MacGregor (2000). Statistical and Causal Model-Based Approaches to Fault Detection and Isolation. *AIChE J.*, 46(9), 1813-1824.
[95] Yoon, S. and J.F. MacGregor (2000), Relationships between statistical and causal model based approaches to fault detection and isolation. In: Proc. Of international symposium on advanced control of chemical processes (ADCHEM 2000), June 14-16, Pisa, Italy, 81-86.
[96] Yoon, S., A. Dasgupta, and G. Miliares (1996), Realtime optimization boosts capacity of Korean olefins plant, Oil and Gas Journal, June 17, 36-41

- **Book chapters**

[1] HW Lee, H Bhatia, SY Park, MH Kamga, T Reimonn, S Sha, Z Huang, and S. Yoon (2019), Process Analytical Technology and Quality by Design for Animal Cell Culture, Cell Culture Engineering: Recombinant Protein Production, 365-390

[2] Yoon, S., S. Galbraith, H. Liu, B. Cha, (2018), Flowsheet modeling of a continuous direct compaction process, Computer Aided Chemical Engineering 41, 121-139 edited by Singh and Yuan, Elsevier

[3] S. Yoon* (2014), Basic principles and application trend of Quality By Design in "Roadmap to Becoming Biopharmaceutical Leader", Editors: Korean FDA, 2014 (in Korean)

[4] Kamga, M, H. Lee, N. Kim, S. Yoon* (**2014**) Modeling of protein monomer/aggregate purification by hydrophobic interaction chromatography: application to column design and process optimization. In Continuous Processing in Pharmaceutical Manufacturing edited by Ganapathy Subramanian, Wiley-VCH 2014

[5] S. Yoon, **(2011),** Multivariate Data Analysis in Biopharmaceutical Application in "PAT Applied in Biopharmaceutical Process Development and Manufacturing" edited by Duncan Low, Jose C. Menezes, and Cenk Undey

- **Invention disclosures & patents: 4**

1) Patent on Inhibitory Metabolites (Inventor: Seongkyu Yoon)
2) Provisional Patent on Continuous Perfusion Media and Process Control (Inventor: Seongkyu Yoon)
3) UML-2013-16 on New method of media formulation and optimization for bio- therapeutic development (Inventor: Seongkyu Yoon) – Turned down
4) Distributed perfusion bioreactor system for continuous culture of biological cells US Patent 10,214,718 (Inventors: O Berteau, Y Seongkyu, D Sergeant, T Poskin)
5) Provisional Patent on Estimation of Viable Cell Density During Late Growth Phase of CHO Cell Culture Using Dielectric Spectroscopy (Inventor: Seongkyu Yoon and Haewoo Lee) – Turn down
6) Provisional Patent (M&E Ref. 118082-00801) on Distributed perfusion bioreactor system for continuous culture of biological cells (Inventors: Olivier Berteau, Apicells; David Sergeant: Ipratech; Seongkyu Yoon: UMass Lowell
7) WP-2317 Sustainable Green Vinyl Ester Resin (GVER) for Renewable Resources (Inventor: Akshay Kokil, Priyank Shah, Seongkyu Yoon, Robert Kovar, Yongwoo Lee)

- **Conferences presentation and invited talks**

[1] Yoon, S. (2022), Identification and Control of Novel Waste Inhibitory Metabolites In CHO Cell-Cultures, ESACT2022, Lisbon Portugal

[2] Morris, Caitlin, and Yoon, S. (2022) Single in-line biomass probe detects CHO cell growth by capacitance and bacterial contamination by conductivity in bioreactor, ESACT2022, Lisbon Portugal

[3] Fu, Qiang and Yoon, S. (2022) Design space determination and process optimization of critical quality attributes in AAV gene therapy manufacturing, ESACT2022, Lisbon Portugal

[4] Graham, RJ. *and S. Yoon (2020)*. "Trace metal variability in culture media can impair CHO culture performance by enhancing mechanisms of oxidative stress." American Chemical Society National Meeting, August 2020, San Francisco, CA.

[5] Graham, RJ. *and S. Yoon*. (2019). "Zinc supplementation improves the harvest purity of β-glucuronidase from CHO cell culture by suppressing apoptosis." AIChE National Meeting, November 2019. Session: *Advances in Bioprocess Design for Cell Culture and Bioproduct Production.* Orlando, FL.

[6] Graham, RJ. *and S. Yoon*. (2019)."Zinc enhances β-glucuronidase secretion from CHO cells by suppressing apoptosis." American Chemical Society National Meeting, April 2018, Orlando, FL.

[7] Yoon, (2019), Biomanufacturing Sciences – Challenges and Opportunities South Dakoda University of Mines and Science

[8] Sha, Yoon, (2019), An Investigation of Nucleotide Sugar Dynamics Under the Galactose Supplementation in CHO Cell Cultures, GlycoBioTech 2019, Jan 28-30, Berlin Germany

[6] Caitlin Morris, S. Yoon, (2019), Manufacturing Platform, Flowsheet Modeling, and Optimization of Continuous Viral Vaccine Production Process Golden Research Conference on Biotherapeutics and Emerging Technology, Galveston, TX.

[7] Sha, Yoon, (2018), RNA-seq data reveals transcriptomic regulation in Chinese Hamster Ovary cell culture, New Orleans, ACS

[8] Galbraith, Yoon (2018), Media Formulation Optimization Based on Multi-Scale Modeling of Heterogeneity in Mammalian Cell Culture Process, New Orleans, ACS

[9] S. Yoon (2018), Biomanufacturing Innovation in Biopharmaceutical Industry, IFPAC, Feb. 2018 (Invited Talk)

[10] S. Yoon (2017), Continuous Pharmaceutical Manufacturing, FDA Workshop, Silver Spring MA, Oct 31, 2017 (Invited Talk)

[11] S. Yoon (2017), Systems Biotechnology in Biomanufacturing Innovation, RAFT (Recent Advances in Fermentation Technology), Oct 30, 2017, Ft. Myers FL (Invited Talk)

[12] S. Yoon (2017), What, how, why quality metrics, US FDA's quality metrics initiative, Global Biotechnology Conference 2017, Jun 2017, Seoul, Korea (Invited Talk)

[13] S. Yoon (2017), How can systems biotechnology add values to biopharmaceutical development and manufacturing? BMS Invited Speaker Series, June 2017, Devens, MA, USA (Invited Talk)

[14] S. Yoon (2017), Missing Opportunities of Multivariate Modeling in Pharmaceutical Sectors, IFPAC 2017, 31th International Forum Process Analytical Technology, Feb 2017, North Bethesda MD, USA

[15] S. Yoon (2017), How can systems biotechnology add values to biopharmaceutical development and manufacturing? Soonchun University, July 2017, Soonchin, Korea (Invited Talk)

[16] Galbraith S. G., and S. Yoon (2017), "Flowsheet Modeling of a Continuous Direct Compression Process at Production Scale", ADCHEM/APC 2017, Jan 2017, Scottdale, AZ

[17] Liu, H. and S. Yoon (2017), "Three-compartmental population balance model and experimental validation of a continuous twin-screw wet granulation process", ADCHEM/APC 2017, Jan, 2017 Scottdale, AZ.

[18] Galbraith S. G., and S. Yoon (2016), "Flowsheet Modeling of a Continuous Direct Compression Process at Production Scale", 2016 AIChE Annual Meeting, Nov 8-13, San Francisco, CA.

[19] Liu, H. and S. Yoon (2016), "Three-compartmental population balance model and experimental validation of a continuous twin-screw wet granulation process", 2016 AIChE Annual Meeting, Nov 8-13, San Francisco, CA.

[20] Park, S., and S. Yoon (2016), "Analyzing amino acids metabolism of hybridoma cell in different culture media and culture process", 2016 AIChE Annual Meeting, Nov 8-13, San Francisco, CA.

[21] S. Yoon (2016), "Biomanufacturing Sciences and Technology Consortium – Challenges and Update", 2016 AIChE Annual Meeting, Nov 8-13, San Francisco, CA.

[22] Behere, K. and S. Yoon (2016), "Evaluation of Resin Degradation in a Chromatography Process", 2016 AIChE Annual Meeting, Nov 8-13, San Francisco, CA.

[23] S. Yoon (2016), "Prediction of glycoform profile of mammalian cell cultures using *in silico* glycosylation network and metabolic flux balance models for advanced biomanufacturing platform", Mammalian Systems Biotechnology Workshop, Aug 11-12, Biopolis Singapore.

[24] S. Yoon (2016), "Realtime prediction of glycoform profile of mammalian cell cultures using *in silico* glycosylation model coupled with extracellular metabolites" US FDA/CDER/OBP seminar series, Jul 25, Silver Spring MD.

[25] S. Yoon (2016), "Control and Estimation of N-Glycosylation for Biotherapeutics Manufacturing", Cell Culture Engineering, May 9-13, Palm Springs CA.

[26] K. Behere and S. Yoon (2016), "Evaluation of a continuous chromatography process through process modeling and resin lifetime study", IFPAC, DC.

[27] H. Liu, and S. Yoon (2016), "Multi-compartmental Population Balance Modelling of a Continuous Twin-Screw Granulation Process", IFPAC, DC.

[28] H. Hemlata and S. Yoon (2016), "Genomics Based Methodology of Cell-Culture Media Formulation for Improved Bio-Therapeutic Productivity and Quality Consistency", IFPAC, DC.

[29] J. L. Staudenmann, and S. Yoon (2016), "NIST/AMTech Program and BSTC Consortium", Feb 2016, IFPAC, DC.

[30] S. Yoon (2016), "Quality Metrics, Challenges, and Tools", IFPAC, DC.

[31] S. Galbraith and S. Yoon (2016), "Blender Modeling in a Continuous Direct Compaction Process using a Tanks in Series Method", Feb. 2016 IFPAC, DC.

[32] H. Hemlata and S. Yoon (2015), "Genomics Based Methodology of Cell-Culture Media Formulation for Improved Bio-Therapeutic Productivity and Quality Consistency", ICB2 Conference, Berkeley CA.

[33] K. Behere and S. Yoon (2015), "Evaluation of a continuous chromatography process through process modeling and resin characterization", ICB2 Conference, Berkeley CA.

[34] H. Hemlata and S. Yoon (2015), "Genomics Based Methodology of Cell-Culture Media Formulation for Improved Bio-Therapeutic Productivity and Quality Consistency", 2015 AIChE Annual Meeting, Nov 8-13, Salt Lake City, UT.

[35] H. Liu, S. Yoon and M. Li (2015), "Two-Compartmental Population Balance Modeling of a Pulsed Spray Fluidized Bed Granulation Based on Computational Fluid Dynamics (CFD) Analysis", 2015 AIChE Annual Meeting, Nov 8-13, Salt Lake City, UT.

[36] S. Sha and S. Yoon (2015), "Prediction of intracellular nucleotide sugar variation impact on monoclonal antibodies (mAbs) glycan distribution using glycosylation reaction network models", 2015 AIChE Annual Meeting, Nov 8-13, Salt Lake City, UT.

[37] S. Yoon (2016), "Systems Biotechnology in Biomanufacturing," Rutgers University, NJ.

[38] S. Yoon (2015), "Regulatory expectation and industrial practices on continuous validation and process performance qualification", 2015 Global Biotechnology Conference, June 30, Songdo, Korea 29 – July 3

[39] M. Kamga, M. Cattaneo, and Seongkyu Yoon (2015), "Continuous Manufacturing: the future of antibody production", DTRA, St. Lois MO, May 14-17

[40] S. Sha, Kurt Brorson, Erik Read, Cyrus Agarabi, Scott Lute, and Seongkyu Yoon (2015), "Investigation of intracellular pathway perturbation leading to antibody glycosylation variation under varied cell culture conditions", IFPAC, VA, Jan 25-28

[41] Z. Huang, Seoyoung Park, Kurt Brorson, Erik Read, Cyrus Agarabi, Scott Lute, and Seongkyu Yoon, (2015), "Metabolic flux analysis for the design of amino acid supplementation in antibody producing mammalian cell culture", IFPAC, VA, Jan 25-28 (Invited)

[42] H. Hemlata, Kurt Brorson, Erik Read, Cyrus Agarabi, Scott Lute, and Seongkyu Yoon, (2015), "Building design space for control of critical quality attributes of a model monoclonal antibody", IFPAC, VA, Jan 25-28

[43] S. Yoon, (2015), "COPA in Research & development", IFPAC, VA, Jan 25-28 (Invited)

[44] S. Yoon, (2014), "How to assess intracellular characteristics of CHO cells? Systems Biotechnology Approach", Monthly Technology Seminar, Bristol-Myer-Squipp, Hopkinton, MA Dec 2014 (Invited)

[45] S. Yoon, (2014), "Building design space for control of critical quality attributes of monoclonal antibody", 2014 Fall Forum, Korean Association of Biopharmaceutical and Pharmaceutical Scientist, Morristown NJ, Nov 2014 (Invited)

[46] S. Yoon, (2014), "Robust Optimization - Design Space Exploration and Examination", 2014 QbD International Forum, Korea Biotech Industry Association, Seoul Korea, Sep 2014 (Invited)

[47] S. Yoon, (2014), "QbD Roadmap – Multivariate statistics applications in biopharmaceutical development and manufacturing", Shire HGT, Lexington MA, June 2014 (Invited)

[48] S. Yoon, (2014), "Assessment, Monitoring and In-Process Control of Critical Raw Material Variability in Mammalian Cell-Culture", Biomanufacturing & Process Innovation Leaders Summit, June 10-12, Boston MA (Invited)

[49] S. Yoon, (2014),"Opportunities of multivariate statistics applications in biopharmaceutical development and manufacturing", AAPS, National Biotechnology Conference, May 19-21, San Diego CA 2014 (Invited)

[50] S. Yoon, (2014), "How to unveil intracellular characteristics of CHO cells? - Metabolic Analysis and Glycosylation Modeling of CHO Cells with Raw Material Variability", University of Massachusetts, BiogenIdec, Cambridge, MA, March 2014 (Invited)

[51] S. Yoon, (2014), "Intracellular characteristics and glycosylation reaction network model", University of Massachusetts, Cell-Culture Engineering Conference, Quebec Canada, May 2014 (Poster Presentation)

[52] S. Yoon, (2014), "Intracellular characteristics and glycosylation reaction network model", University of Massachusetts, Mass Biologics, West Roxbury, MA, March 2014 (Invited)

[53] S. Yoon, (2014), "Intracellular characteristics of Chinese Hamster Ovary Cells", IFPAC, DC, Jan 21-25 (Invited)

[54] S. Yoon, (2014), "Simulation and Optimization of Continuous Downstream Process in Biopharmaceutical Manufacturing", PEPTALK, Palm Springs, CA, Jan 13-17, 2014 (Invited)

[55] S. Yoon, (2013), "Spectral Technology Application in Biologics", Eastern Analytical Symposium, Summit NJ, November 2013 (Invited)

[56] N. Trunfio, H. Lee and S. Yoon, (2013), "Raw material characterization for mammalian cell-cultures using spectral technologies", Eastern Analytical Symposium, Summit NJ., November 2013

[57] S. Yoon, (2013),"Transformative ManufacturingTechnologies", Bioprocess International 2013, Boston MA, Sep 16-20, 2013

[58] S. Yoon, (2013), "Monitoring and Control in Pilot Scale Biologics Production", Bioprocessing Summit 2013, Boston MA, August 19-23, 2013

[59] S. Yoon, and K. Behere (2013), "Optimization of Continuous Downstream Process in Biopharmaceutical Manufacturing", PREP 2013, Boston USA, July 14-16, 2013

[60] S. Yoon, K. Behere, and J. Yun (2013), "Optimization of Continuous Downstream Process in Biopharmaceutical Manufacturing", Continuous Processing in Biopharmaceutical Manufacturing, Cambridge UK, July 1-2, 2013

[61] S. Yoon. O. Berteau and H. Hemlata (2013), "Systems approach for media formulation and optimization", ESACT 2013, France, June 21-24

[62] S. Yoon. O. Berteau and H. Lee (2013), "Estimation of Viable Cell Density During Late Growth Phase of CHO Cell Culture Using Dielectric Spectroscopy", ESACT 2013, France, June 21-24

[63] S. Yoon and H. Lee (2013), "Gene Transcriptomics and metabolic effects of Trace Elements on Productivity and Product Quality of Mammalian CHO Cells", 2nd Metabolomics and Systems Biology, Chicago IL, 2013

[64] S. Yoon (2013), "Manufacturing Sciences in Biopharmaceutical Industry", 3rd International Symposium on Research, Development and Manufacturing of Biopharmaceuticals in Global Market, Osong Medical Innovation Foundation, Korea, 2013 (Invited Talk)

[65] S. Yoon (2013), "Intracellular Metabolic Flux Analysis of CHO cells Supplemented with Wheat Hydrolysates for Improved mAb Production and Cell-growth", Quality by Design International Workshop, Osong Medical Innovation Foundation, Korea, Oct 2013 (Invited Talk)

[66] S. Yoon (2013), "Assessment, monitoring and in-process control of critical raw material variability in mammalian cell-culture", 2013 Raw material characterization IBC Summit, San Diego CA, 2013

[67] S. Yoon (2013), "Improved Estimation of Viable Cell Density using Dielectric Spectroscopy", 2013 Aber Instrument Webinar, Feb 4, 2013

[68] H. Lee and S. Yoon (2013), "Advanced Real-time Monitoring of Cell Growth in Therapeutic Protein Production using Dielectric Spectroscopy and Chemometrics", IFPAC, Baltimore MD, 2013

[69] S. Yoon (2012), "Converting data into value – multivariate data analysis in biopharmaceutical", Lonza Biologics, Portsmouth NH (Invited talk)

[70] H. Lee and S. Yoon (2012), "Variability management and in-process control of critical raw materials in mammalian cell-cultures," 2012 Process to Product Summit, DC Oct 31-1 2012

[71] S. Yoon (2012), "Assessing and controlling the raw material variability in mammalian cell culture", 2012 Bioprocessing Summit, Boston MA Aug 20-23 2012

[72] M. Kamga, and S. Yoon (2012), Application of Process Analytical Technology in Protein Purification: Use of Second & Fourth Derivative Ultra Violet (UV) for Making Real-Time Pooling Decisions in Chromatography, PREP 2012, July 2012, Cambridge MA

[73] A. Bawn, H. Lee, S. Yoon (2012), "Batch quality control of monoclonal antibody product (MAb) in mammalian cell-culture", *2012 ASEE Northeast Section Conference*, Lowell, MA, April 2012. (No record)

[74] O. Karpuz, S. Yoon (2012), "Transcriptional Investigation of Lactate Metabolism of CHO Cells", *2012 ASEE Northeast Section Conference*, Lowell, MA, April 2012. (No record)

[75] M. Kamga, H. Lee and S. Yoon (2012), Modeling and binding capacity estimation of hydrophobic interaction chromatography, Biopharmaceutical Summit 2012, March 2012, Lowell MA

[76] K. Riojas, H. Lee, and S. Yoon (2012), Characterization of glycosylation in CHO cell culture using fluorescence spectroscopy, Biopharmaceutical Summit 2012, March 2012, Lowell MA

[77] O. Karpuz, and S. Yoon (2012), Transcriptional Investigation of Lactate Metabolism of CHO Cells, Biopharmaceutical Summit 2012, March 2012, Lowell MA

[78] A. Bawn, S. Yoon, A. Downey, O Karpuz, J. Xu (2012), Technology comparison for measuring metabolic components in mammalian cell culture processes, Biopharmaceutical Summit 2012, March 2012, Lowell MA

[79] A. Bawn, H. Lee, S. Yoon (2012), Batch quality control of monoclonal antibody product (MAb) in mammalian cell-culture, Biopharmaceutical Summit 2012, March 2012, Lowell MA

[80] H. Lee, S. Yoon (2012), Rapid Assessment of Raw Material Quality for Therapeutic Protein Production in Mammalian Cell Culture Using Data Fusion with Multiple Spectroscopic Measurements, Biopharmaceutical Summit 2012, March 2012, Lowell MA

[81] S. Dutta and S. Yoon (2012), Systematic media optimization of CHO cells for biosimilar development, Biopharmaceutical Summit 2012, March 2012, Lowell MA

[82] S. Yoon (2012), Next generation biopharmaceutical process, Biopharmaceutical Summit 2012, March 2012, Lowell MA (No slide)

[83] H. Lee and S. Yoon (2012), Complementary data fusion for raw materials in mammalian cell-culture, CEC XIII, April 2012, Scottsdate, AZ (No slide)

[84] H. Lee and S. Yoon (2012), Data fusion based assessment of raw materials in mammalian cell-culture, CPC VIII, Jan 2012, Savannah, GA

[85] H Lee and S. Yoon (2011), Breast Cancer Growth Modeling, AIChE Annual conference, Oct 2011, Minneapolis, MN (No slide)

[86] Jay Liu and S. Yoon (2011), Automatic grading of TFT-LCD glass substrates using machine vision, AIChE Annual conference, Oct 2011,Minneapolis, MN

[87] S. Yoon (2011), Process control of mammalian cell-culture product quality, IBC's 2nd annual workshop on Process 2 Product, Washington DC, Oct. 2011

[88] Bawn, A., H. Lee, R. Baggio and S. Yoon (2011), Understanding cell-culture through multi-spectra data fusion, FACSS, Reno NV, Oct. 2011

[89] Baggio R., S. Yoon (2011), Insights into cell physiology phenomenon for multiple CHO batch processes using near-infrared spectroscopy and quantitative modeling, FACSS, Reno NV, Oct. 2011

[90] S. Yoon (2011), Prediction of cell-culture performance and product quality with analytical measurements of raw material ingredient, BMD Summit 2011, San Diego, CA, September 13~15, 2011

[91] S. Yoon (2011), Feature selection of mass spectroscopy for robust ovarian cancer diagnosis, Early Cancer Detection Therapeutics in Global Health, NIH Workshop, Bethesda, MD, July 17, 2011 (NO Slide)

[92] M. Kamga and S. Yoon (2011), Hydrophobic Interaction Chromatography Resin Variability: Raman Data and the Kinetics of Adsorption, Raman spectroscopy applied to Bioprocessing, RTP, NC (No slide)

[93] S. Yoon (2011), Trends in Biopharmaceutical – micro and macroscopic views, Korean Scientist and Engineer Association, MIT, Cambridge, MA

[94] A. Gupta and S. Yoon (2011), Ozone based cleaning technology, Sustainable Remediation Conference, June 1, 2011, Amherst, MA

[95] H. Lee and S. Yoon (2011), "Feature selection of mass spectroscopy for robust ovarian cancer diagnosis", 2nd Annual Clinical and Translational Science Research Retreat, May 12 2011, Worcester MA *(Selected as the best poster*)

[96] N. Trunfio, Victor Neel, Anna Yaroslavsky, and Seongkyu Yoon (2011), Image processing and delineation for the intra-operative mapping of nonmelanoma skin cancer, 2011 Massachusetts Undergraduate Research Conference, Amherst, MA (No slide)

[97] H. Lee, YoungJeong Na, Joon Jeong, and Seongkyu Yoon, (2011), Comparative study on feature selection methods in ovarian cancer diagnosis using chemometric tools, 2011 AACR, Orlando, FL

[98] N. Trunfio, Hae Woo Lee, Seongkyu Yoon, Victor Neel and Anna Yaroslavsky, (2011), Chemometrics based image processing and delineation for the intraoperative mapping of nonmelanoma skin cancer, 2011 AACR, Orlando, FL

[99] Yoon, S., C. Lawton, A. Bawn, and R. Baggio, (2011), Characterization of critical raw material impact on mammalian cell-culture performance and product quality attributes, 2011 IFPAC, Baltimore, MD

[100] Gupta, A., C. Lawton, and S. Yoon, (2011), Future cleaning technology, turning cleaning and sterilization green, 2011 IFPAC, Baltimore, MD (Abstract only)

[101] Yoon, S., C. Lawton, J. Xu, and J. Liu, (2010), Statistical Modeling and Analysis for Safety and Efficacy of Biological Products, 2010 AIChE Annual Meeting, Salt Lake City, UT

[102] Yoon, S., S. Bauer, M. Byers, E. Dolinski, (2010), Recognizing Challenges and Overcoming Common Obstacles with QbD. *IVT 2nd QbD workshop,* Philadelphia, PA., USA

[103] Yoon, S., W. Lichtman, S. Koutopoulas, (2009), Cultural change in implementing new process monitoring technology. *Umetrics user conference,* Boston, MA., USA

[104] Yoon, S., J. F. MacGregor, Mark-Johns Bruwer (2007), Batch Process Control – when to add nutrient feed and harvest. *IBCs Process Analytical Technology,* San Diego.CA., USA

[105] Yoon, S., G. Mitchell, J. Ganguly, M. Lanan, W. Lichtman (2007), An industry survey – Is PAT possible in Biologics? *IBCs Process Analytical Technology,* San Diego.CA., USA

[106] Yoon, S. (2006), Process Analytical Technology: Case studies for process understanding, *IVT conference*, San Diego, CA

[107] Yoon, S. (2006), Process Validation using statistics and experimental design, *IVT conference*, San Diego, CA

[108] Yoon, S. (2006), Process Analytical Technology: Case studies for process understanding, *IVT conference*, Dublin, Ireland

[109] Yoon, S. (2006), Process Validation using statistics and experimental design, *IVT conference*, Dublin Ireland

[110] Yoon, S. (2005), PAT and Multivariate Data Analysis, *2005 Spring Symposium AIChE North Jersey Meeting,* Schering-Plough, Kenilworth, NJ. USA

[111] Mishra, S., J. M. Griffiths, B. Miller, E. Goodreau, and S. Yoon (2004), Multivariate Batch Modeling of a Cell Culture Manufacturing Process at BiogenIdec. *IBCs Process Analytical Technology,* Arlington, VA., USA

[112] Yoon, S., C. Ambrozic, N. Kettaneh, and S. Wold (2004), Process Analytical Technology: Multivariate Statistical Process Control for Drug Manufacturing Processes. *18th IFPAC (International Forum on Process Analytics and Chemistry*, Arlington, VA., USA

[113] Yoon, S. and J. F. MacGregor (2000), PCA of multiscale data and its application to fault diagnosis. *AIChE Annual meeting*, Nov. 11~17, Los Angeles, CA, USA,

[114] Yoon, S. and J. F. MacGregor (1998). Sensor fault diagnosis for dynamic systems using multivariate statistical methods, *AIChE Annual meeting*, Nov. 10~15, Miami, FL, USA,

[115] Boureau, F., T. Kassidas, P. Nomikos, L. Ronholm, A. Silva, W. Yip, S. Yoon, T.E. Marlin (1998). Design the learning goals, then the simulator for effective process control education, *AIChE Annual meeting*, Nov. 10~15, Miami, FL, USA,

[116] Yoon, S., H. Sun, and S. Han (1996), Hyundai Petrochemical's CIM (Computer Integrated Manufacturing) Master Plan, Sichem96 Proc., P.242-263, Seoul, Korea

[117] Yoon, S. A. Dasgupta, G. Mijares (1995), Realtime Optimization System for Hyundai Petrochemical Olefins Complex, 1995 NPRA Computer Conference, Nashville, TN. USA

[118] Yoon, S., R. A. Krantz, A. Rao, W. B. Stewart (1992), Global realtime optimization of flexible olefin plants, *AIChE Annual meeting*, Nov. 10~15, Miami, FL, USA

[119] Yoon, S. and S. W. Park (1989), Admissible Model Algorithmic Control for Non-minimum phase multi-input multi-output system, 1989 Korean Chemical Engineering Conference, Pohang, Korea, Apr. Korea.

UNIVERSITY AND COMMUNITY ACIVITIES

- **University, College and Department Committees:**

Committee	Term	Frequency of Meeting	Accomplishment	Role
Biomedical Engineering and Biotechnology Personal Committee	2015 - Current	On-going	Hiring research/adjunct faculty	Member

Non-tenure track hiring committee	2010-current	Every week in the semester	Reviewed all applications and Identified finalists	Member
Tenure track hiring committee	2010-current	Every week in the semester	Reviewed applications and identified finalists	Member
Graduate Committee	2010 - Current	Ad-hoc	Qualification exam and PhD degree requirement proposal Preparation	Member
Biomedical Minor Committee	2011 Fall	Ad-hoc	Developing proposal draft	Member
Graduate Qualification Exam Improvement	2012 Spring	Ad-hoc	Developing new qualification exam proposal	Member
Faculty senate	2014 – 2017	Once a month	Voting on University's GPAC/UPAC Proposals	Member
Pharmaceutical Science Graduate Committee	2014 – Current	Ad-hoc	Pharmaceutical Science Program	Member

- **Biopharmaceutical Industry Community:**

Conferences, workshops, training program organizer for professional community

Professional Community Activities	Location, Date	Results
NSF/IUCRC AMBIC Biannual Meeting	(Hybrid) 2021	
NSF/IUCRC AMBIC Biannual Meeting	(Virtual) 2020	
NSF/IUCRC AMBIC Biannual Meeting	College Park MD, Dec, 2019	
NSF/IUCRC AMBIC Biannual Meeting	St, Louis MO, Dec 10-12, 2018	
NSF/IUCRC AMBIC Biannual Meeting	South San Francisco, June 18-20, 2018	
Industry short course coordinator: "Continuous Chromatography",	Lowell MA, Oct 17, 2018	
Industry short course coordinator: "QbD/PAT in Biopharmaceutical",	Lowell MA, Oct 24, 2018	
Industry short course coordinator: "Advanced Industrial Bioprocessing",	Lowell MA, Aug 6-10, 2018	
Conference Chair and Coordinator: "Biomanufacturing Innovation", Biomanufacturing Annual Summit	Boston MA, Sep 9-10, 2018	
Session Chair/Co-Chair: "Biomanufacturing", IFPAC 2018	North Bethesda, MD, Feb. 2018	
Industry short course coordinator: "Advanced Bioprocessing",	May 24-26, 2017	

6th Biopharmaceutical Summit – Beyond mAbs	May 22-23, 2017 Boston, MA	21 speakers, 25 posters, 140 professionals attended from 50 companies
Biopharmaceutical Summit Training - Coordinator	May 24-26, 2017 Boston MA	Advanced Industrial Bioprocessing Training, 17 People attended
5th Biopharmaceutical Summit – Future Biomanufacturing	May 23-24, 2016 Lowell MA	26 speakers, 30 posters, 150 professionals attended from 50 companies
Biopharmaceutical Summit / Training - Coordinator	May 18-20, 2016 Lowell MA	Continuous Bioprocessing Training, 10 People attended
Biopharmaceutical Summit – Training	May 25-27, 2016 Lowell MA	Fundamental of PAT & QbD in Biopharmaceutical, 10 People attended
Multivariate Statistics – Training	Jun-Aug 2015, FDA	Fundamental of PAT & QbD in Biopharmaceutical, 12 FDA staff attended
4th Biopharmaceutical Summit - Raw material variability	May 18-19, 2015 Lowell MA	25 speakers and panelists, 18 posters, 100 professionals attended from 35 companies
Biopharmaceutical Summit – Training	May 20-22, 2015 Lowell MA	Fundamental of PAT & QbD in Biopharmaceutical, 15 People attended
3rd Biopharmaceutical Summit - PAT and QbD	May 29-30, 2014 Lowell MA	21 speakers and panelists, 30 posters, 145 professionals attended from 50 companies
Biopharmaceutical Summit – Training	May 27-28, 2014 Lowell MA	Fundamental of PAT & QbD in Biopharmaceutical, 25 People attended
2nd Biopharmaceutical Summit - Continuous Bioprocessing	May 15 2013 Lowell MA	13 speakers and panelists, 15 posters, 145 professionals attended from 50 companies. Chancellor and provost came to give welcome talks.
Biopharmaceutical Summit / Training - Coordinator	May 13-14, 2013 Lowell MA	Continuous Bioprocessing Training, 25 People attended
PSM (Professional Science Master) workshop – Training Technology Leaders of Korea Coordinator	June 17-21, 2013 Lowell MA	PSM workshop for Korean Professors
PAT Training	Oct 27, 2013 Seoul Korea	2 days of training for 40 biopharmaceutical engineers
1st Biopharmaceutical Summit - Biopharmaceutical Challenges and Innovations	March 9 2012 Lowell MA	20 speakers and panelists, 22 posters, 150 professionals attended from 60 companies including FDA, Massachusetts Life Sciences Center, most big biopharmaceuticals; Chancellor and MLSC CEO came to give welcome talks.
Founded Biopharmaceutical Product and Quality Consortium with UMass S&T funding - Assembled steering committee - Assembled advisory board - Started cell-line development	Univ. of Massachusetts Lowell	

project for biosimilar		

INSTRUCTION RELATED ACTIVITY

- **Students graduated with thesis, project or independent study**

1) Ashli Polanco (Transferred PhD in Jan 2018 in Completed in May 2022, Now at Biogen), Elucidating the combined metabolic effects of Zinc and copper supplementation on CHO cell culture
2) William Stuart (Started PhD in September 2012 and converted as part-time student in 2013, Completed in May 2022 Completer in May 2022), Inhibition of embryonic ectoderm development as a novel mechanism for fetal hemoglobin induction in sickle cell disease
3) Ryan Graham (Started PhD in September 2017, and completed in Dec 2020, Now at Genentech), CHO Trace-Metal Characterization
4) Bingyu Kuang (Started PhD in September 2016, and completed in Dec 2021, Now at Abbie), Inhibitory Metabolites Identification and Control
5) Nivedita Shirpurkas (Started MS in Sep 2016 and Completed in Dec 2020 in Chemical Engineering, now at Takeda)
6) Zhuangrong Huang (Started PhD in September 2013, and completed in Dec 2019, Now at BMS), CHO Genome Scale Modeling
7) Mark Henry Kamga (Started PhD in September 2015, and completed in Dec 2019, Now at Thermofisher), CHO Epigenetic characteristics
8) Sha Sha (Started PhD in September 2013, and completed in Dec 2018, Now at Ultrazenyx), CHO Glycosylation
9) Ashwitha Rajagopal, (Started MS in Sep 2017 in Biological Sciences, and completed in May 2018, Now at BMS)
10) Alessandro Mora (Started PhD in September 2012 as part-time PhD, full time at Abbott), Metabolic Flux Analysis for mammalian cell-culture, Completed in Dec 2017, Now at)
11) Hemlata Hemlata (Started PhD in January 2013, Completed in Dec 2017, Now at Takeda), Systems approach for media formulation and Optimization
12) Seoyoung Park (Started PhD in September 2013, Completed in Dec 2017, Now at Sungkuenkwan Univ as re), Metabolomics of CHO cell Culture
13) Nicholas Trunfio (Started PhD in September 2013, Completed in Dec 2017, now at FDA), Cell Network
14) Ketki Behere, PhD, Downstream process development for continuous bioprocessing, (Completed in April 2017, Now at BMS)
15) Thomas Reimonn, Honors Thesis, Dynamic Metabolic Flux Balance Modeling of Hybridoma Cell-Culture (Completed in May 2015, Now MD/PhD at UMass Medical School)
16) MarkHenry Kamga, Master of Science, Hydrophobic Interaction Chromatography Modeling and Characterization, (Completed in Dec 2012. Now enrolled in PhD program after 3 years of works)
17) Andrew Bawn, Master of Science, Characterization of Raw material impact to Cell Growth, MS, (Completed in Dec 2012, now at Joule Unlimited, now at Abbive)
18) Nicholas Trunfio, Undergraduate project on Image Processing of Skin Cancer using Multivariate Statistical Method, 2012

19) Sumit Dutta, Master of Science, Cell line development, 2012 (Graduated in 2012 December, now at Pfizer)
20) Karina Riojas, Master of Science, Chemometrics analysis of mammalian cell-culture (Graduated in 2013 May, now at Takeda)
21) Ketki Dashkar, Master of Science, Chromatography modeling (Graduated in 2014 May, now at Biogen)
22) Omer Karpuz (Started in September 2011 and transferred in May 2012 to Yildiz Technical University, Turkey)

- **Current graduate students –9 PhD candidates, 0 Master Students**

1) Yongdan Wang (Started PhD in May 2020)
2) Soyoung Park (Started PhD in May 2020)
3) Richard Marx (Started PhD in May 2019)
4) Qiang Fu (Started PhD in May 2019)
5) Yongsuk Lee (Started MS in 2018 and transferred to PhD in Sep 2019)
6) George Liang (Started PhD in Sep 2019)
7) Caitlin Morris (Started PhD in May 2018)
8) Duc Huong (Started PhD in Sep 2018)
9) Zhao Wang (Started PhD in Jan 2018)

- **FDA ORISE Fellowship**

1) Jaewan Lee, 2021-2022
2) George Liang, 2020-2021
3) Caitlin Morris, 2019-2020
4) Ryan Graham, 2017, 2018 Summer
5) Bingyu Kuang, 2017 Summer
6) MarkHenry Kamga, 2015 Summer, 2016 Summer
7) Hemlata Hemlata, 2016 Summer
8) Nicholas Trunfio, 2016 Summer/Fall, 2017 Spring/Summer/Fall
9) Sha Sha, 2014 Summer, 2015 Summer

- **Post-doctoral fellows/Research Engineer – 8 Fellows**

1) Dr. Prokash Paul (Feb 2016 – 2018, Full-time)
2) Dr. Shaun Galbraith (March 2015 – Jan 2020: Full-time; Jan 2020 – Current: Part Time)
3) Dr. Huolong Liu (April 2015 – May 2020, Full Time), AstraZeneca
4) Dr. Bumjoon Cha (October 2015 – Aug. 2017, Full Time), Samsung Biologics
5) Dr. Namjoon Kim (January 2013 – Aug 2020, Part-time), MilliporeSigma
6) Dr. Mohammd Masuri (November 2015 – Feb 2016, Full-time), Now at Amgen (Cambridge, MA)
7) Dr. Nate Kingsbury (March 2016 – Sep 2016, Full-time). Now at Millipore (San Diego, CA)
8) Dr. Haewoo Lee (Aug 2010 – Oct 2013, Now at DGMIF (Daegu Kyungbuk Medical Innovation Foundation as Sr. Research Staff))

Jul 15, 2022

Signature | Date Filed